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ABSTRACT

In order to determine whether differences exist between undergraduate music majors preparing for teaching careers in music and experienced secondary-level choral teachers in regard to their ability to detect pitch errors, a Pitch Error Detection (PED) test was developed, and a questionnaire designed to retrieve information about the subjects' musical education was devised. Statistical analysis of test results for 62 undergraduate music majors at the University of Wisconsin and 38 experienced secondary choral teachers in the state of Wisconsin indicated that there was no significant difference in the performance of the two groups, but that those teachers with 6 to 10 years of teaching experience did significantly better than the undergraduate music majors. It was also noted that subjects holding masters degrees (usually the same as those with 6 to 10 years of experience) performed better on the PED test than juniors, seniors, and bachelors degree holders, and that students who maintained an A average in 2 years of music theory did significantly better on the test than other students. These findings suggest that although teaching experience does not seem to contribute to improving competency in pitch error detection, graduate study and a good grasp of music theory may be related to this competency. (RT)

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AN ANALYSIS OF FACTORS RELATED TO CHORAL TEACHERS' ABILITY TO DETECT PITCH ERRORS WHILE READING THE SCORE

CARROLL LEE GONZO

Purpose

The purpose of this study was to determine whether differences existed between undergraduate music majors preparing for teaching careers in music and experienced choral teachers teaching music at the secondary level in regard to their ability to detect pitch errors. It was the aim of this investigation to make recommendations for teacher education in terms of what could be emphasized, improved or changed in order to more fully develop pitch error detection ability.

Procedures

A Pitch Error Detection Test cast in the choral medium was developed. In addition to this a questionnaire designed to retrieve information about the subjects' musical education was devised. A pilot test was conducted at Wisconsin State University at Whitewater in an effort to refine the test in terms of validity and reliability. The subjects used for the final investigation consisted of 62 undergraduate music majors at the University of Wisconsin preparing for teaching careers in music, and 38 experienced secondary choral teachers in the state of Wisconsin. Their test scores were statistically analyzed in terms of their relationship to the information obtained from the questionnaire. The statistical procedures employed for the analysis included Fortran Test Analysis Package, analysis of variance, stepwise regression analysis and rank order correlation.

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Results

There was no significant difference between experienced choral teachers

as a group and undergraduate music majors as a group in regard to their performance on the Pitch Error Detection Test (PED Test). Teachers with 6 to 10 years of teaching experience did significantly better on the test than did the undergraduate music majors as a group. Teachers with 6 to 10 years of teaching experience did significantly better on the test than did the seniors, but not significantly better than the juniors. There was no significant difference between the juniors and seniors in terms of their performance on the test. There was no significant difference among teachers grouped according to years of teaching experience in terms of their performance on the test. There was no significant difference among teachers grouped according to years of teaching experience in terms of their performance on the PED Test. Subjects holding master's degrees performed better on the test than did the juniors, seniors, and bachelor's degree holders.

In terms of the number of correct responses, both students and teachers agreed as to which test items were easy, moderately easy, and difficult. The type of response (checking, circling, writing) exhibited by students and teachers on the test was not significantly different. Both the students and teachers showed a marked preference for merely checking the box beneath the pitch error as their method of response. Writing the required correct note was the least preferred form of response.

Students who maintained an A average in two years of theory did significantly better on the test than students who maintained less than an A average. The results show that of the college music courses considered in this investigation, choral arranging was the only course significantly related to performance on the test.

Conclusions

These findings suggest that neither the students nor the teachers improved significantly in score reading after having two years of theory. This would suggest, perhaps, that teachers do not use their pitch error detection as effectively as they could. Although teachers with 6 to 10 years of experience did better than the total undergraduate sample, this may be attributed more to the fact that the majority held master's degrees than to the fact they had had more teaching experience. The similarity of the students and teachers in terms of the types of responses they chose may be due to the possibility that teaching experience does not contribute to this competency or the fact that a subject's competence in pitch error detection may not be reflected in his test performance. The significant performance of the A students, however, lends credence to the assumption that a good grasp of the fundamental elements of music theory may be related to the ability to detect pitch errors.

TABLE 1.1

Means, Variances, and Standard Deviations
of the Students' and Teachers PED Scores

Group	N	$\bar{X}$	S^2	SD
Students	62	553.31	2725.07	52.20
Teachers	38	562.53	3517.34	59.31

TABLE 1.2

Analysis of Variance of PED Scores
Achieved by Students and Teachers

Source	SS	MS	df	F	Sig.
Between	200.27	200.27	1	.662	.41
Within	296370.65	2024.19	98		
Total	298373.39				

TABLE 2.1

Means, Variances and Standard Deviations
of the PED Scores Achieved by the Students and Teachers

Group		N	$\bar{X}$	S^2	SD
UG Seniors		35	550.00	2820.06	53.10
UG Juniors		27	560.22	2537.79	50.37
UG Students		62	553.31	2725.07	52.20
Teachers' Exp	1-5	11	548.45	2913.07	53.97
	6-10	16	587.56	4865.06	69.75
	11-15	5	552.20	947.70	30.78
	16-34	6	530.16	1044.17	32.31
Teachers		38	562.53	3517.34	59.31

TABLE 2.2

Analysis of Variance of PED Scores Achieved by
The Students Group and By Teachers with 1-5 Years
of Teaching Experience

Source	SS	MS	df	F	Sig.
Between	219.93	219.93	1	.080	.77
Within	195359.90	2751.55	71		
Total	195579.83				

TABLE 2.3

Analysis of Variance of PED Scores Achieved
by the Student Group and By Teachers With 6-10 Years of
Teaching Experience

Source	SS	MS	df	F	Sig.
Between	14924.21	14924.21	1	4.742	.03*
Within	239205.11	3147.43	76		
Total	254129.33				

TABLE 2.4

Analysis of Variance of PED Scores Achieved by Seniors
And By Teachers With 6 to 10 Years of Teaching Experience

Source	SS	MS	df	F	Sig.
Between	15351.04	15351.04	1	4.438	.04*
Within	166037.93	3459.12	48		
Total	181388.98				

TABLE 3.1

Means, Variances, and Standard Deviations of PED Scores Achieved by the Juniors, Seniors, Bachelor's, and Master's

Group	N	$\bar{X}$	S^2	S
Juniors	27	560.22	2537.79	50.37
Seniors	34	550.00	2820.06	53.10
Bachelor's	23	539.91	3076.45	55.46
Master's	16	589.81	3050.83	55.23

TABLE 3.2

Analysis of Variance of PED Scores Achieved By Juniors, Seniors, Bachelor's, and Master's

Source	SS	MS	df	F	Sig.
Between	25884.46	8628.15	3	3.040	.03*
Within	272488.93	2838.42	96		
Total	298373.39				

TABLE 4.1

Means, Variances, and Standard Deviations of PED Scores Achieved By Students With An A, B, or C Average in Their First Two Years of Theory

Group	N	$\bar{X}$	S^2	S.D.
A	8	600.50	1716.00	41.42
B	17	535.59	1320.38	36.33
C	11	547.27	1706.62	41.31

TABLE 4.2

Analysis of Variance of PED Scores Achieved By Students With an A or B Average in Their First Two Years of Theory

Source	SS	MS	df	F	Sig.
Between	22921.64	22921.64	1	15.909	.001*
Within	33138.11	1440.79	23		
Total	56059.76				

TABLE 4.3

Analysis of Variance of PED Scores Achieved By Students With an A or C Average in Their First Two Years of Theory

Source	SS	MS	df	F	Sig.
Between	13121.92	13121.92	1	7.671	.01**
Within	29078.18	1710.48	17		
Total	42200.10				

TABLE 4.4

Analysis of Variance of PED Scores Achieved by Students With A, B, or C Average in Their First Two Years of Theory

Source	S	MS	df	F	Sig.
Between	911.80	911.80	1	.621	.43
Within	38192.30	1468.93	26		
Total	39104.10				

TABLE 5.1

Means, Variances, and Standard Deviations of PED Scores Achieved by Subjects With Zero to One Year of Study in Choral Arranging

Group	(YRS)	N	$\bar{X}$	S^2	S
1	(0)	74	549.28	2613.27	51.12
2	(1)	26	578.23	3659.30	60.49

TABLE 5.2

Analysis of Variance of PED Scores Achieved by Subjects With Zero to One Year of Study in Choral Arranging

Source	SS	MS	df	F	Sig.
Between	16121.73	16121.73	1	5.598	.02*
Within	282251.66	28801.19			
Total	298373.39				

TABLE 6

Summary of Total Responses to the Items on the PED Test by Students and Teachers

Easy				Moderately Difficult			
Item	S	T	S-T Total	Item	S	T	S-T Total
1	72%	50%	64%	11	43%	39%	43%
2	14%	8%	14%	12	20%	26%	23%
3	22%	34%	27%	13	29%	34%	31%
4	16%	18%	17%	14	21%	18%	21%
5	67%	57%	64%	15	24%	26%	25%
6	20%	34%	26%	16	19%	23%	21%
7	10%	8%	10%	17	19%	26%	22%
8	13%	23%	18%	18	20%	28%	25%
9	25%	31%	29%	19	24%	23%	24%
10	10%	13%	10%	20	8%	13%	12%

Difficult			
Item	S	T	S-T Total
21	13%	24%	17%
22	20%	18%	20%
23	14%	13%	14%
24	20%	18%	20%
25	19%	23%	21%
26	22%	23%	23%
27	17%	28%	22%
28	27%	28%	28%
29	22%	21%	21%
30	6%	7%	7%

TABLE 7

Hoyt Reliability Analysis of the PED Test

Source	DF	SS	MS	F	R
Ind	99	535.68	5.41	5.128	.80
Items	557	10036.76	18.05		
Error	55044	58074.55			
Total	55699	68646.99			

TABLE 8

A Re-ordering of the Test Items From Easy To Difficult
Based on the Test Results

		Students				Teachers			
Rank	Test Item	Chk.	Cir.	Wri.	Total	Chk.	Cir.	Wri.	Total
1	1	21%	10%	41%	72%	0%	36%	14%	50%
2	5	4%	20%	43%	67%	16%	13%	28%	57%
3	11	16%	12%	15%	43%	13%	16%	10%	39%
4	13	19%	2%	8%	29%	14%	15%	5%	34%
5	9	3%	3%	19%	25%	10%	8%	13%	31%
6	28	14%	7%	6%	27%	21%	6%	1%	28%
7	3	8%	7%	7%	22%	16%	10%	8%	34%
8	6	13%	6%	1%	20%	26%	8%	0%	34%
9	15	3%	8%	13%	24%	10%	6%	5%	21%
10	18	5%	13%	3%	20%	10%	13%	5%	28%
Average %		8%	7%	11%	28%	14%	9%	7%	31%
21	24	5%	5%	10%	22%	5%	5%	8%	18%
22	8	5%	3%	5%	13%	16%	2%	5%	23%
23	4	14%	0%	2%	16%	16%	2%	0%	18%
24	21	5%	5%	3%	13%	10%	7%	7%	24%
25	2	10%	8%	0%	18%	5%	3%	0%	8%
26	23	5%	8%	1%	14%	5%	5%	3%	13%
27	20	5%	1%	2%	8%	5%	0%	8%	13%
28	10	5%	3%	2%	10%	5%	5%	3%	13%
29	7	7%	3%	0%	10%	2%	6%	0%	8%
30	30	3%	2%	1%	6%	5%	0%	2%	7%
Average %		6%	4%	3%	13%	7%	3%	4%	14%

TABLE 9

Summary of Students' and Teachers' Level of Response Competency on the PED Test

	Checking	%	Circling	%	Writing	%	Total
Students	524	21%	378	12%	460	7%	1362
Teachers	453	24%	292	13%	237	5%	982
Total	977		670		697		2344

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